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Karsten Strehl

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EXAMINER

KIM, EUNHEE

ART UNIT

PAPER NUMBER

2123

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,284	<b>Applicant(s)</b> STREHL, KARSTEN	
	<b>Examiner</b> Eunhee Kim	<b>Art Unit</b> 2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 16 and 18-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16 and 18-35 is/are rejected.
- 7) ☒ Claim(s) 16 and 27-29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/30/2009</u> .  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

1. Applicants are informed that the Examiner of record has changed.
2. The amendment filed 12/29/2009 has been received and considered.

Claims 16 and 18-35 are presented for examination.

***Claim Objections***

3. Claim 16 and 27-29 are objected to because of the following informalities:

Claim recites the limitation "their order" in line 16 (Claim 16), line 17 (Claim 27 and 28), and line 18 (claim 29) which is unclear what the limitation refers. "order" of what?

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 30-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 30 and 31 recites the limitation "the cross-bar switch" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 32 recites the limitation "the respective process module" in line 2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 16, 18-23, 27-29 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seungwoo et al. (Debugging protocol for remote cross development environment) in view of Petters et al. (The REAR Framework for Emulation and Analysis of Embedded Hard Real-Time System).

As per Claim 16 and 27-29, Seungwoo et al. teaches a simulation system, a host unit for a simulation system (Section 5), a computer implemented method for computer-implemented simulation (section 5), comprising:

a simulation host-target architecture (Section 5);

wherein a operating system operating system of the a target of the host-target architecture, the target representing at least a part of the control system (OS: pg. 397, section 4.2, 2<sup>nd</sup> paragraph, lns 4-6), is reconfigured by the host of the host-target architecture via a first application programming interface associated with the operating system of the target (functions: pg 397, section 4.2, 2<sup>nd</sup> paragraph lines 4-8: see table 2),

Seungwoo et al. fails to teach explicitly verification of a control system under development comprising a real- time operating system is reconfigured as to dynamically

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reconfigure at least one of the following real-time-properties of the real time operation system (Section 2.2):

- a kind of task, including at least one of a periodic task, an ISR task, a task invoked by software, and a task occurring upon application mode initialization (Section 2.2),

- a task priority and a scheduling mode, which includes one of a cooperative mode, a pre-emptive mode, and a non-pre-emptivable mode (Section 2.2),

- a task period and a task offset (Section 2.2),

- a task deadline and a maximum number of activations (Section 2.2),

- a content of the task, the content including processes within the task and their order, and application modes of the operating system (Section 2.2),

- resources, alarms, and counters (Section 2.2),

- I/O configuration and network management (Section 2.2), and

- events and messages for communication and for an association thereof (Section 2.2).

Petters et al. teaches verification of a control system under development (Title and Introduction) comprising a real- time operating system is reconfigured as to dynamically reconfigure at least one of the following real-time-properties of the real time operation system (Section 2.2):

- a kind of task, including at least one of a periodic task, an ISR task, a task invoked by software, and a task occurring upon application mode initialization (Section 2.2),

- a task priority and a scheduling mode, which includes one of a cooperative mode, a pre-emptive mode, and a non-pre-emptivable mode (Section 2.2),

- a task period and a task offset (Section 2.2),

a task deadline and a maximum number of activations (Section 2.2),  
a content of the task, the content including processes within the task and their order, and  
application modes of the operating system (Section 2.2),  
resources, alarms, and counters (Section 2.2),  
I/O configuration and network management (Section 2.2), and  
events and messages for communication and for an association thereof (Section 2.2).  
Seungwoo et al. and Petters et al. are analogous art because they are both related to a  
host-target architecture simulation.

Therefore, it would have been obvious to one of ordinary skill in the art of at the time the  
invention was made to have included the teaching of Petters et al., with the method of  
debugging protocol for remote cross development environment of Seungwoo et al. to  
substantially reduce development times (Petters et al.: Abstract).

As per claim 18, Seungwoo teaches wherein the operating system (RTOS) is  
reconfigured after downloading an executable software onto the target (pg 397, section 5, 1st  
paragraph, lns 4-8) so that a real-time behavior of a software of the simulation target is one of  
defined and altered (pg 397, section 5, 2nd paragraph, lns 1-3). An interactive shell is used to  
access including reading, writing which changes the configuration of the operating system.

As per claim 19, Seungwoo teaches wherein the first application programming interface  
associated with the operating system is a part of the operating system(interactive shell: pg 397,  
section 5, 1<sup>st</sup> paragraph, lns 8-10).

As per claim 20, Seungwoo teaches a second application programming interface associated with the operating system (QDI) wherein the second application programming interface associated with the operating system is a part of the operating system (pg 395, section 2, paragraph 5, lns 6-10); wherein the first application programming interface associated with the operating system is not part of the operating system (table 2).

As per claim 21, Seungwoo teaches wherein the simulation host includes at least one modeling tool and wherein software of the control system is executed on the simulation target (remote debugger: abstract & pg 394, section 1, 2<sup>nd</sup> paragraph, lns 22-24).

As per claim 22, Seungwoo teaches a target server for connecting the at least one modeling tool with the simulation target (target resources: pg 394, section 1, 1<sup>st</sup> paragraph, lns 12-15).

As per claim 23, Seungwoo teaches wherein the target server includes a protocol driver of a communication protocol used for communication with the simulation target (RTOS: pg 396, section 3, 2<sup>nd</sup> paragraph, lns 1-6).

As per claim 33, Seungwoo fails to teach explicitly wherein the simulation host includes at least one modeling tool, and wherein a software of the control system is executed on the simulation target.

Petters et al. teaches wherein the simulation host includes at least one modeling tool, and wherein a software of the control system is executed on the simulation target (Fig. 1 and section 2.1).

As per claim 34, Seungwoo fails to teach explicitly a target server for connecting the at least one modeling tool with the simulation target.

Petters et al. teaches a target server for connecting the at least one modeling tool with the simulation target (section 2.1).

As per claim 35, Seungwoo fails to teach explicitly wherein the target server includes a protocol driver of a communication protocol used for communication with the simulation target.

Petters et al. teaches wherein the target server includes a protocol driver of a communication protocol used for communication with the simulation target (section 2.1).

6. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seungwoo et al. (Debugging protocol for remote cross development environment) in view of Petters et al. (The REAR Framework for Emulation and Analysis of Embedded Hard Real-Time System), further in view of Sano et al. (US5991533).

Seungwoo et al. as modified by Petters et al. teaches most all of the instant invention as applied to claims 16, 18-23, 27-29 and 33-35 above.



As per claim 24, Seungwoo et al. as modified by Petters et al. fails to teach explicitly a plurality of simulation process modules with corresponding memory modules and interface modules, wherein the simulation process modules represent distinct memory locations for facilitating inter-module communications.

Sano et al. teaches a plurality of simulation process modules (logic simulator 66: col. 21, lns 20-27: see fig 25) with corresponding memory modules (disk 53: col.9, lns 54-56) and interface modules (692: see fig 48) wherein the simulation process modules represent distinct memory locations (disk 53) for facilitating inter-module communications (link information: col 11 and 12, X3, X6, and X10).

Seungwoo et al. as modified by Petters et al. and Sano et al. are analogous art because they are both related to a simulation system.

Therefore, it would have been obvious to one of ordinary skill in the art of at the time the invention was made to have included the teaching of Sano et al., with the method of debugging protocol for remote cross development environment of Seungwoo et al. as modified by Petters et al. to enhance the efficiency of design of a sequence control system using a PLC (col 28, lns 60-63 of Sano et al.).

As per claim 25, Seungwoo et al. as modified by Petters et al. fails to teach explicitly wherein the computer-implemented simulation is performed by executing a control system simulation model, and wherein the control system simulation model includes a plurality of sub-models executed on the corresponding plurality of simulation process modules.

Sano et al. teaches wherein the computer-implemented simulation (simulator 66) is performed by executing a control system simulation model (virtual system 68: col 23, lns 8-13: see fig 48), and wherein the control system simulation model includes a plurality of sub-models executed on the corresponding plurality of simulation process modules (plc model 681 and process model 682: col 23, lns 12-15: see fig 48).

As per claim 26, Seungwoo et al. as modified by Petters et al. fails to teach explicitly wherein at least some of the simulation process modules are dynamically reconfigurable by communication via the distinct memory locations.

Sano et al. teaches wherein at least some of the simulation process modules (logic simulator 66: col. 21, lns 20-27: see fig 25) are dynamically reconfigurable by communication via the distinct memory locations (modification: col 12, X10).

7. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seungwoo et al. (Debugging protocol for remote cross development environment), in view of Petters et al. (The REAR Framework for Emulation and Analysis of Embedded Hard Real-Time System), further in view of Baxter (US 20040107331 A1).

Seungwoo et al. as modified by Petters et al. teaches most all of the instant invention as applied to claims 16, 18-23, 27-29 and 33-35 above.

As per Claim 30, Seungwoo et al. as modified by Petters et al. fails to teach explicitly wherein the cross-bar switch replicates data under real time conditions.

Baxter teaches wherein the cross-bar switch replicates data under real time conditions ([0097]-[0114], [0138]).

Seungwoo et al. as modified by Petters et al. and Baxter are analogous art because they are both related to a dynamic co system.

Therefore, it would have been obvious to one of ordinary skill in the art of at the time the invention was made to have included the teaching of Baxter, with the method of debugging protocol for remote cross development environment of Seungwoo et al. as modified by Petters et al. to maximize system productivity (Baxter: [0006]).

As per Claim 31, Seungwoo et al. as modified by Petters et al. fails to teach explicitly wherein the cross-bar switch copies values of output signals to communication variables after reaching a consistent state.

Baxter teaches wherein the cross-bar switch copies values of output signals to communication variables after reaching a consistent state ([0097]-[0114]).

As per Claim 32, Seungwoo et al. as modified by Petters et al. fails to teach explicitly wherein the cross-bar switch passes the values of output signals before the respective process modules continue computation.

Baxter teaches wherein the cross-bar switch passes the values of output signals before the respective process modules continue computation ([0097]-[0114]).

### ***Response to Arguments***

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8. Applicant's arguments filed 12/29/2009 have been fully considered but they are not persuasive.

Examiner respectfully withdraws Drawing Objections in view of the amendment and/or applicant's arguments.

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection - Petters et al. (US 6,632,089).

Applicant has argued that:

As further regards all of the obviousness rejections, any Official Notice is respectfully traversed to the extent that it is maintained and it is requested that the Examiner provide specific evidence to establish those assertions and/or contentions that may be supported by the Official Notices under 37 C.F.R. § 1.104(d)(2) or otherwise. In particular, it is respectfully requested that the Examiner provide an affidavit and/or that the Examiner provide published information concerning these assertions. This is because the § 103 rejections are apparently being based on assertions that draw on facts within the personal knowledge of the Examiner, since no support was provided for these otherwise conclusory and unsupported assertions. (.See also MPEP § 2144.03).

It is noted that there is no Official Notice is presented in the previous office action.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eunhee Kim whose telephone number is 571-272-2164. The examiner can normally be reached on 8:30am-5:00pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Eunhee Kim/  
Examiner, Art Unit 2123

/Paul L Rodriguez/  
Supervisory Patent Examiner, Art Unit 2123